EMI/RFI LAB

$1.00

Simpson

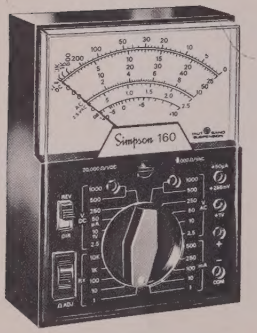
INSTRUMENTS THAT STAY ACCURATE

OPERATOR'S MANUAL

MODEL 229 LEAKAGE CURRENT TESTER

SIMPSON ELECTRIC COMPANY
5200 W. Kinzie St., Chicago, Illinois 60644
Area Code 312, Telephone 379-1121
In Canada, Bach-Simpson, Ltd., London, Ontario

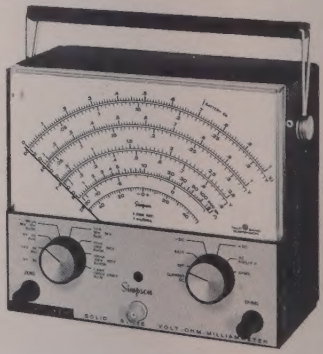
new VOMs from Simpson



160 Handi-VOM

Just 3 5/16" Wide . . .
with Full-Size VOM Features

- 20,000 Ω VDC . . . 5,000 Ω VAC
- ±2% DC . . . ±3% AC
- 5 Resistance Ranges . . . Plus a 0-250 DC Millivolt Range



313 Solid-State VOM

VTVM Features . . . VOM Conveniences

- Uses a single 9-volt battery
- 10 Meg Ω DC . . . 11 Meg Ω AC
- Large 7" scale

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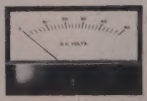
Simpson has over 1,400 stock sizes and types of panel instruments, too!



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OPERATOR'S MANUAL

MODEL 229
LEAKAGE CURRENT TESTER

SIMPSON ELECTRIC COMPANY

5200 W. Kinzie St., Chicago, Illinois 60644
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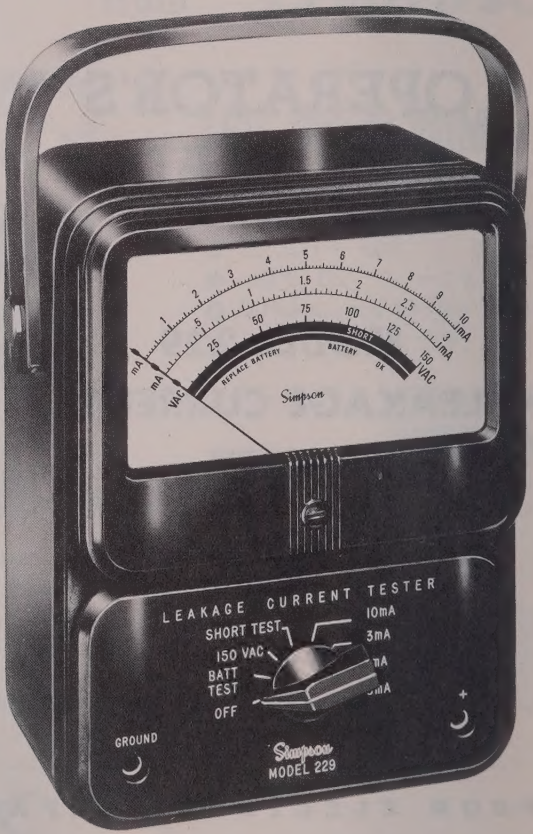

Figure 1
Model 229 Leakage Current Tester

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WHAT IS LEAKAGE CURRENT?

Leakage current is the electrical current which flows between electrical conductors and the metal enclosures or exposed metal parts of electrical appliances, electrically operated hand tools, and other electrically operated devices. Leakage current flows because of insulation resistance and distributed capacity between electrical conductors and the metal enclosures or exposed metal parts of electrical devices and the resistance (or impedance) presented by a person touching the metal enclosure or exposed metal parts of an electrical device and a point at ground potential such as radiator pipes, water pipes, or the third wire of a power line.

WHY MEASURE LEAKAGE CURRENT?

The reasons for measuring leakage current are two-fold:

First, leakage current is measured to determine if the leakage current of a particular electrical device could be large enough so that the current flowing between a person touching the metal enclosure or exposed metal parts of the electrical device and ground could be large enough so that the user perceives the electrical current flow (the current level is above the person's threshold of perception). In this case, the user could react violently out of fear in such a way as to injure himself or someone else.

Second, leakage current is measured to determine if an electrical device is shorted or nearly shorted between its metal enclosure or exposed metal parts and one of the electrical conductors supplying current to the device under test. This can cause the person touching the metal enclosure or exposed metal parts of an electrical appliance and ground (radiator pipes, water pipes, etc.) to get a dangerous or sometimes even lethal shock. In addition, a person could also suffer injury because of a violent physical reaction.

All electrical devices made should therefore be tested to insure that the leakage current flow cannot exceed the threshold of perception level of nearly everyone.

THRESHOLD OF PERCEPTION

The threshold of perception is the current level at which a particular person just perceives the electrical current flowing through his body. A mean value of perception current equal to 1.067 mA @ 60 Hz was determined by tests performed on 28 men by Charles F. Dalziel (see AIEE Proceedings, Volume 69, 1950, Section 0184, "Effect of Frequency on Perception Currents"). However, it should be kept in mind that the threshold of perception of some individuals tested was considerably less than 1.067 mA @ 60 Hz.

ELECTRICAL SPECIFICATIONS:

1. Ranges: Batt. Test, 150 VAC, Short Test, 10 mA, 3 mA, 1 mA and 0.3 mA.
2. Input Impedance on Current Ranges: 1500 ohms Resistance shunted by shaping network.
3. Input resistance on voltage range: 500 K ohms.
4. Accuracy @ 60 Hz sine wave: ±2% on voltage and current ranges.
5. Accuracy vs. Frequency: Approximates Dalziel's Percentile 50 Threshold of Perception Curve within ±1.0 dB.
6. User protection: The user is fully protected against shock hazard by use of heavy insulated test leads and test clips and by use of recessed jacks in the front panel of the tester.
7. Tester protection: Instrument and circuitry fully protected up to 150 VAC on all ranges. Also, the circuitry is fully protected thermally by use of Epoxy potting.

OPERATING INSTRUCTIONS:

1. Turn the selector switch to the "Battery Test" position. The pointer will deflect to the right-hand side of the dial if the battery is O.K., as indicated on the lowermost arc.
2. Turn the selector switch to the "Short Test" position.
3. Connect Model 229, Leakage Current Tester, as shown:

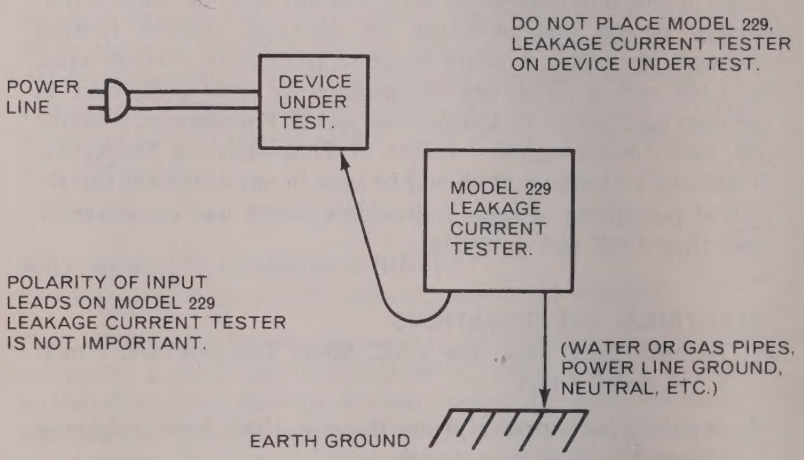

DO NOT PLACE MODEL 229, LEAKAGE CURRENT TESTER ON DEVICE UNDER TEST.
POWER LINE
DEVICE UNDER TEST.
MODEL 229 LEAKAGE CURRENT TESTER.
POLARITY OF INPUT LEADS ON MODEL 229 LEAKAGE CURRENT TESTER IS NOT IMPORTANT.
(WATER OR GAS PIPES, POWER LINE GROUND, NEUTRAL, ETC.)
EARTH GROUND

Figure 2

4. If the pointer is deflected to the red area on the second arc from the bottom, the leakage current is greater than 10 mA and a short is probable in the device under test. If the pointer is deflected into the *green* area, the leakage current may be measured by turning the selector switch on the Model 229, Leakage Current Tester, to the appropriate current range position.
5. Line voltage measurements up to 150 volts may be made by turning the selector switch to the "150 VAC" position, and reading the voltage from the scale marked "VAC."

SERVICING:

For servicing of the Model 229, Leakage Current Tester, return unit to:

Simpson Electric Company
5200 W. Kinzie Street
Chicago, Illinois 60644

For battery replacement, remove back of case by removing the four screws at the four corners of the case, and replace the used battery with a Burgess, 9 Volt, Type PM6, Simpson Part No. 5-112598, or equivalent.

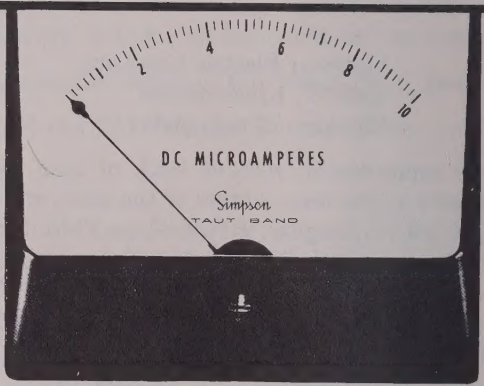
/- Short test -/ Glen Simpson

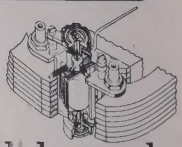
Apply 125 1405 ext

±2% 150 VAC position
moitor input

turn Shorttest 125 V

Set to 150 VAC
1. Apply 125 VAC
A.) tolerance ±2%
2 Set to short test
A) should read 125V ±2%





here's the taut band reliability you should demand

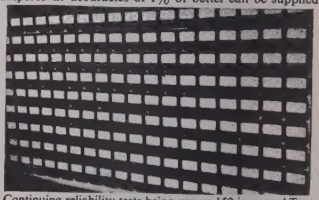
Simpson's search for reliability began at a major source of trouble—the overly complicated design of conventional Taut Band suspensions. The result was an improved suspension with 25% fewer parts.

Because of this, you would expect life expectancy to zoom, and trouble to nose dive. And that's just what happened.

The Ultimate in Test Programs—As just one step in a comprehensive test program to insure reliability measuring up to today's needs, Simpson engineers put 150 of the improved Taut Band meters on a continuing 24-hour test (cycled zero to full scale 2200 times per hour). As of August 30, 1964, the 150 meters have logged 25,243,000 cycles without failure. This is equivalent to over 70 years of normal operation. Weekly calibration checks show that the meters are holding ± ½% accuracy. Simpson Taut Band meters also passed ASA tests for extreme temperature, humidity, shock, and vibration.

Stocked for Immediate Delivery—Present units stocked are microammeters in 2½", 3½", and 4½" sizes. Ranges are 10, 15, 25, 50, 100 ua; accuracy, ± 2% F.S. *For fast service, call your distributor.*

Special Requirements—Contact your Simpson representative or the factory. Sensitivities as low as 2 microamperes at accuracies of 1% or better can be supplied.



Continuing reliability tests being run on 150 improved Taut Band meters with 20 pivot-jewel meters used as control units.

WRITE FOR Bulletin PM-505.

Simpson

DIVISION

Representatives in Principal Cities ...See Telephone Yellow Pages

SIMPSON ELECTRIC COMPANY
5202 W. Kinzie Street, Chicago, Illinois 60644 • Phone: (312) EStebrook 9-1121
California: Simpson Instruments, Inc., P.O. Box 488, 1130 Simpson Way, Escondido, Calif. • Phone: (714) SH 5-8202
In Canada: Bach-Simpson Ltd., London, Ontario
In India: Ruttonsha-Simpson Private Ltd., International House, Bombay-Agra Road, Vikbrail, Bombay

INSTRUMENTS THAT STAY ACCURATE

Warranty

SIMPSON ELECTRIC COMPANY warrants each instrument and other articles of equipment manufactured by it to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any instrument or other article of equipment which shall within 90 days after delivery of such instrument or other article of equipment to the original purchaser be returned intact to it, or to one of its authorized service stations, with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and SIMPSON ELECTRIC COMPANY neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sale of its products.

This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside the SIMPSON ELECTRIC COMPANY factory or authorized service stations, nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by the manufacturer.

Simpson ELECTRIC COMPANY
5200 W. Kinzie Street, Chicago, Illinois 60644 Phone: (312) 379-1121
Export Dept: 400 W. Madison Street, Chicago, Illinois 60606, Cable, Simelco
IN CANADA: Bach-Simpson Ltd., London, Ontario
IN INDIA: Ruttonsha-Simpson Private Ltd., International House, Bombay-Agra Road, Vikhroli, Bombay
AGM DIVISION

Quality is the indispensable component of every Simpson instrument . . . . . .